

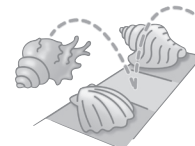
# LESSON 24

CLASSWORK

## Shell Game Electron Configurations

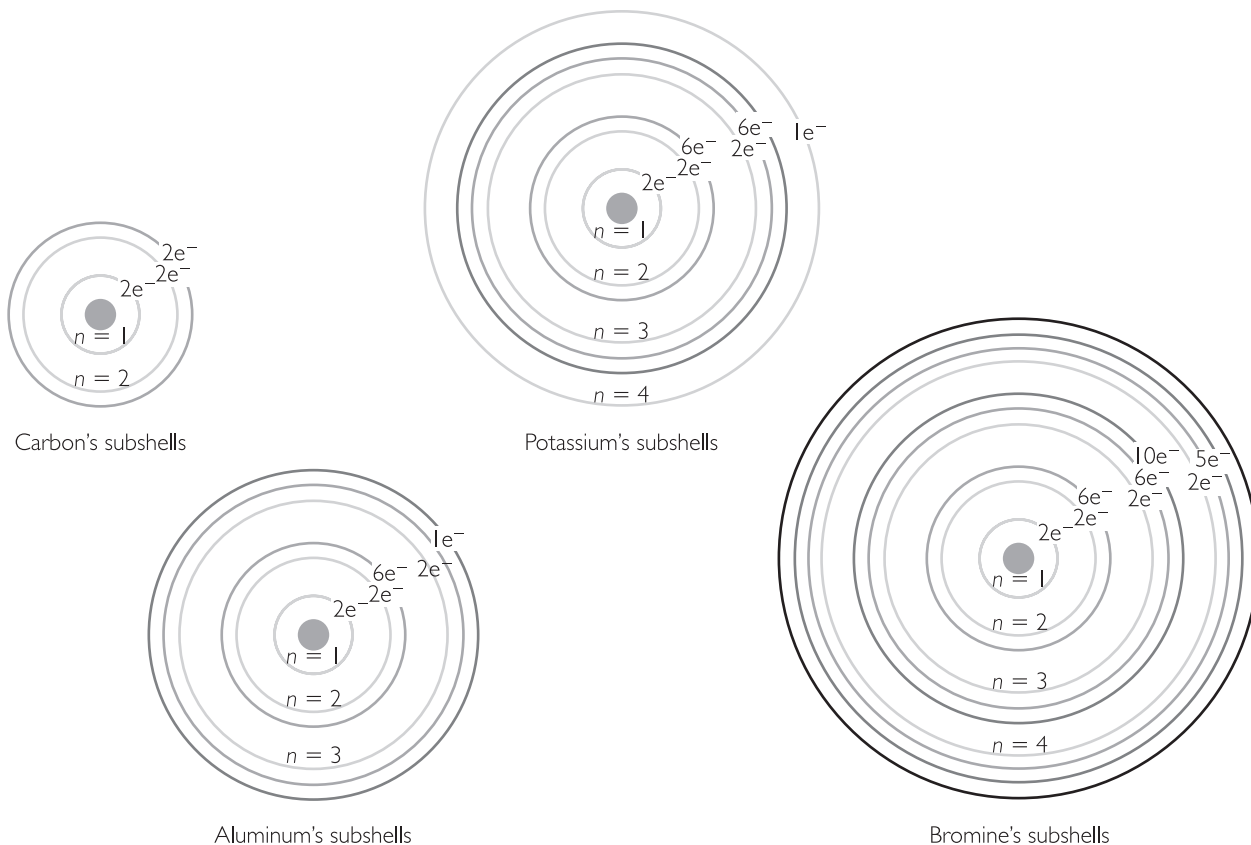
Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_



### Purpose

To examine the arrangements of electrons in subshells.



1. Use the drawings to help you complete the table. Write the number of electrons in each subshell in the boxes.

	1s	2s	2p	3s	3p	3d	4s	4p	4d	4f
Carbon	2e <sup>-</sup>	2e <sup>-</sup>	2e <sup>-</sup>							
Aluminum										
Potassium										
Bromine										

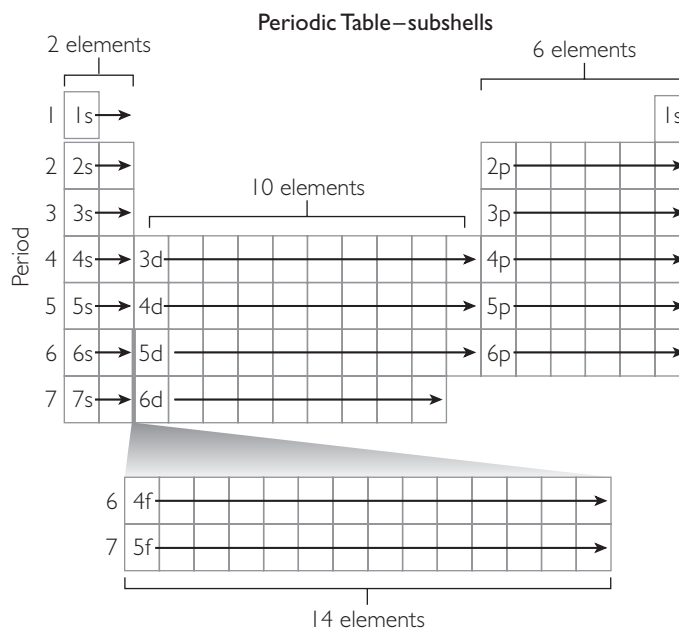
2. What do the s subshells have in common? The p subshells? The d subshells?

3. What are the maximum numbers of electrons in each of the subshells?

1s: \_\_\_\_\_ 2s: \_\_\_\_\_ 2p: \_\_\_\_\_

3s: \_\_\_\_\_ 3p: \_\_\_\_\_ 3d: \_\_\_\_\_ 4s: \_\_\_\_\_

Use this periodic table and your own periodic table to explore how electrons fill subshells.



4. How is the number of subshells in a shell related to the shell number,  $n$ ?

5. Where on the periodic table can you find the elements that have their valence electrons in s subshells?

6. Where on the periodic table can you find the elements that have from one to nine electrons in d subshells?

7. List the elements with five electrons in the outermost p subshell.

8. An **electron configuration** is a list of all the subshells for the atoms of an element. The number of electrons in each subshell is written as a superscript. Here are the electron configurations for carbon and potassium. Predict the electron configurations for aluminum and bromine.

carbon:  $1s^2 2s^2 2p^2$

aluminum:

potassium:  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$

bromine:

9. Write the name and symbol of the element associated with each electron configuration in the table.

Electron configuration	Element
$1s^2 2s^1$	
$1s^2 2s^2 2p^3$	nitrogen, N
$1s^2 2s^2 2p^6 3s^2 3p^5$	
$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$	
$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^2$	

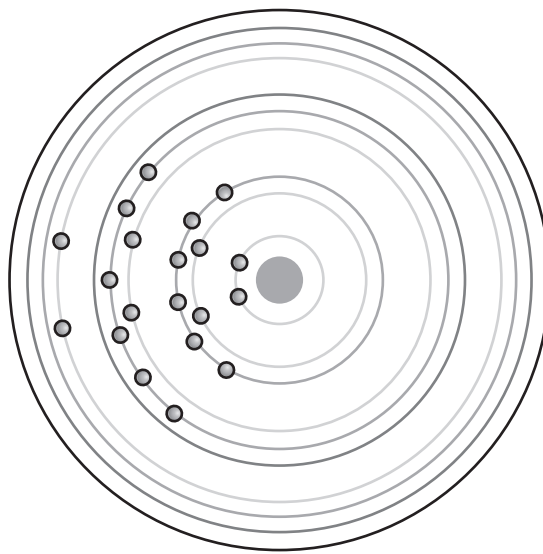
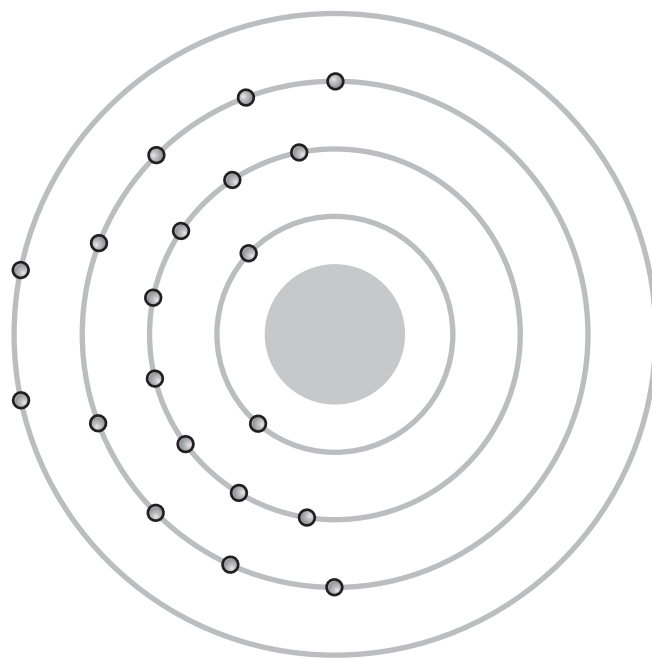
10. **Making Sense** How are the organization and structure of the periodic table related to electron subshells?

11. **If You Finish Early** What would you predict for the maximum number of electrons that f subshells can hold? Explain your reasoning.

## ChemCatalyst

These drawings show two different ways to represent the arrangement of the electrons in atoms of the element calcium, Ca.

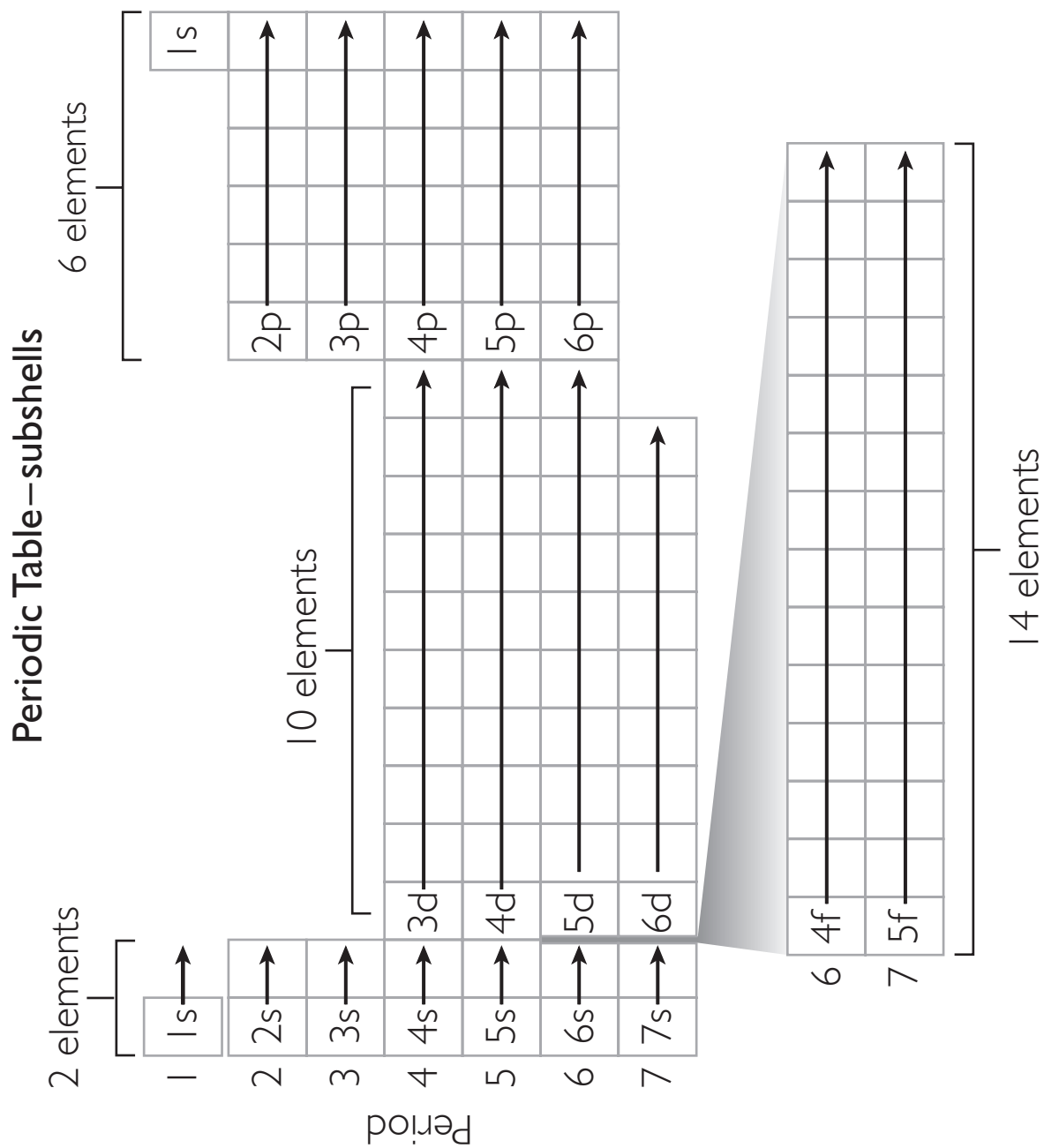
1. Name at least two differences in the drawings.
2. Name at least two similarities in the drawings.



## Electron Shells and Subshells

Shell	Number of electrons in the shell	Subshell	Number of electrons in the subshell
$n = 1$	2	1s	
$n = 2$	8	2s	
		2p	
$n = 3$	18	3s	
		3p	
		3d	
$n = 4$	32	4s	
		4p	
		4d	
		4f	

# Subshell Blocks



# Electron Configurations

